Nertera scapanioides (Rubiaceae) redescribed

Rhys O. Gardner

Auckland Museum, Private Bag 92018, Auckland, New Zealand

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Abstract

Nertera scapanioides Lange, endemic to New Zealand, is redescribed and compared to the five other species of *Nertera* in this country. A local but often abundant plant of lowland to mid-altitude peat bogs of parts of the North I., South I. and Stewart Island, it is distinguished by its almost orbicular, cordate leaves and slender, non-striated, multicellular hairs. The original description of *N. scapanioides* was based on material cultivated in Copenhagen in the 1860s, but the ultimate source of this remains unknown.

Keywords: *Nertera scapanioides* - *Nertera* - Rubiaceae - taxonomy - New Zealand flora

Introduction

This article redescribes *Nertera scapanioides*, a lowly bog plant lost to the sight of New Zealand botany for almost a hundred years. Comparative data on the five other New Zealand species of *Nertera* are also provided. The species that has been known as *Nertera setulosa* (Allan 1961) is here considered to belong to a separate genus *Leptostigma* (Fosberg 1982) and its character is considered elsewhere (Gardner 1999).

In his evaluation of the taxonomy and biogeography of Rubiaceae subtribe Coprosminae, Heads (1996) chose to include all species of *Nertera* and *Leptostigma* in an enlarged *Coprosma*, and he supplied new names for some of the transfers, or revived old ones, for example *Coprosma nertera* F. Muell. for *Nertera depressa* Banks & Sol. ex Gaertn. These names are not used in the present article, since it is concluded elsewhere (Gardner 1999) that the three genera can usefully be maintained.

Materials and Methods

This work is based mainly on study of material in New Zealand herbaria. During 1996-7 observations were also made on live plants of *Nertera scapanioides* and other species referred to below. These plants were growing naturally or were in cultivation in Auckland gardens. Anatomical investigations on wood anatomy and hair morphology were made using hand-sections stained with chlor-zinc-iodine or phloroglucinol-HCl.

Taxonomy

It is difficult to begin without quoting Allan's (1961: 591) plaintive footnote:

> "I know nothing of *N. scapanioides* Lange Ind. Sem. Hort. haun. 1868, 22, said to occur in N.Z."

Cheeseman (1925) and other workers on the New Zealand flora had overlooked the citation of this name in Index Kewensis (Jackson 1896), where only the literature reference and the indication of origin "N. Zel." are given.

The existence of *Nertera scapanioides* was probably brought to Allan's attention by the late Ruth Mason, who was beginning her studies on the genus at about that time (B.M. Macmillan pers. comm.). In 1962 Mason examined the type

material held in Copenhagen (C) and later that year she was able to annotate sheets in AK and CHR as belonging to *N. scapanioides*. The single sheet in AK had been collected by Cheeseman and labelled by him *N. dichondrifolia*. For some reason Mason made no determinations of *N. scapanioides* material at WELT, where there are specimens of Kirk labelled by him as *N. dichondrifolia* and specimens of Petrie labelled only to genus.

In the intervening thirty-five years the judgement of Lange and Mason has been accepted by N.Z. botanists and *N. scapanioides* is now well-represented in our herbaria. It has been illustrated, though not in an analytical way, by Wilson (1982), Johnson and Brooke (1989), and Moss (1996).

Redescription of the species

Except where stated the characters noted below are of the live plant.

Nertera scapanioides Lange, Index Sem. Hort. Haun. 22 ("1868" [1869])

Holotypus. "Hort. Bot. Haun. 16 Mai 1866, *s.n.* 'ignota a Nova Zeelandia' hort. Hull. diff. a *Nertera depressa*. *Nertera scapanioides* mh. ad int. ulterius inquirenda" [scrips. Lange]. C [one sheet, *n.v.*; photo. CHR !].

The protologue has a 13 lines long description of the plant, mention of the material on which the name is based, and comparisons with other *Nertera* species.

Description. Creeping perennial herb, forming mats or loose cushions to c. 5 cm deep, the hairs of the vegetative parts c. 0.75 mm long, 5-8 (-13)- celled, ± straight, slender, thin-walled, acicular, contorting somewhat when dry; crimson flecks on stem, petiole and margins of leaf blade; tissues not foetid.

Stems terete, 0.4-1.0 mm diam., glabrous or sparsely hairy (rarely very hairy, near base of stipules); stipules triangular, fused above petiole base to form a low sheathing collar, lobes dark-glandular at apex (but distinct colleters lacking), the hairs mostly near base; petioles to c. 5 mm long, flattened to slightly concave above, pilose along upper margins, the hairs ± patent; leaf blades to c. 6.5 × 7 mm, broad-ovate to almost suborbicular, rounded at apex, cordate at base, glabrous or sometimes with hairs on proximal margins (rarely hairs on surfaces, in Fiordland specimens), upper surface with prominulous midrib and lateral veins, the numerous stomata becoming prominent in dried material and appearing as minute but conspicuous pale tubercles, stomata fewer on lower surface; raphides c. 0.25 mm long.

Flowers solitary, terminal, sessile between a pair of somewhat reduced leaves, bisexual, protogynous. Calyx rim-like, with 2 or 4 minute triangular lobes; corolla funnelform, tube c. 1 mm long, the lobes 4, c.1 mm long, fully reflexed at anthesis, ± translucent but crimson-mottled externally, margins papillose; filaments c. 1.6 mm long, entirely free, the anthers 0.4 mm long, introrse; pollen mid-yellow, grains appearing smooth at × 400 magnification; styles free to base or slightly fused below, at maturity spreading widely, the exserted (stigmatic) parts c. 1.5 mm long, somewhat fleshy, slightly flattened dorsiventrally, minutely papillose adaxially and over margins.

Fruit ± globose, c. 4 mm diam., orange when ripe (usually ageing to mid-scarlet?); pyrenes c. 2.3 mm long, opening from base up by splitting around the margins for a short way, the lines of weakness not curving inwards over the adaxial face. Embryo about two thirds as long as seed. (Fig. 1, 3, 4, 5).

Chromosome Number. n=22 (Hair 1963), based on 3 collections (CHR, !).

Distribution (Fig. 2). Northern New Zealand south to Fiordland, Southland and Stewart Island, but apparently absent from the East Cape-Wairarapa region and from Marlborough, Canterbury, Otago, and Chatham Island. Usually found on wet peat and peaty clays, often under a shrub layer of manuka (*Leptospermum scoparium*)

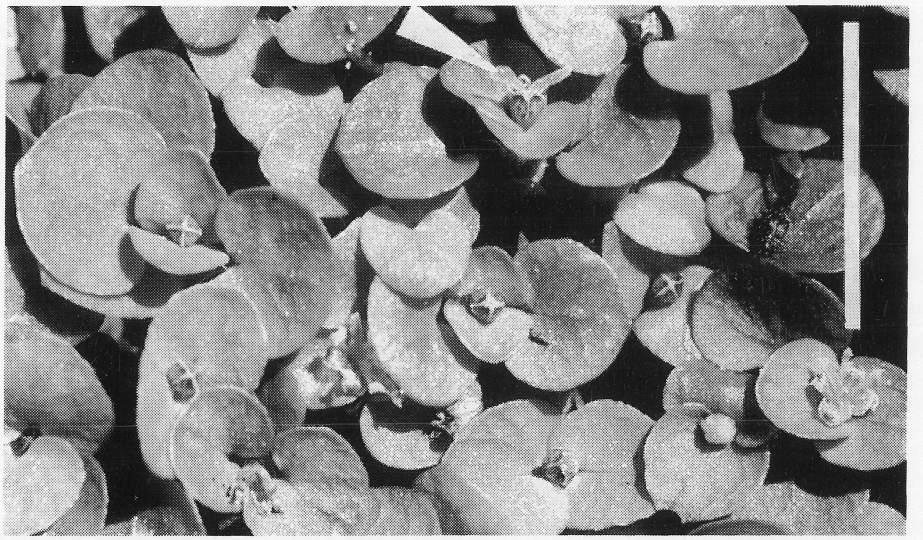

Figure 1 *Nertera scapanioides* (cultivated, ex Whangamarino Swamp). Drop of exudate on stigma arrowed. Scale bar equals 1 cm.

and accompanied there by various species of sphagnum moss (*Sphagnum cristatum* and *S. novo-zelandicum* at least).

Mark & Adams (1973) illustrate the species as an alpine plant but this is probably an error - although their voucher specimen cannot be located at OTA (R. Tangey pers. comm.) the two other so-named high-altitude collections in that herbarium are actually *N. ciliata* (OTA 21086, 32901). The highest recorded altitude for *N. scapanioides* is 1150 m, in the Ruahine Ranges, North Island.

The distribution of the species as shown in Fig. 2 is of the material listed in *Representative Specimens* along with the Horowhenua localities of Duguid (1990).

Flowers and Fruit

The flowers in *Nertera scapanioides* are bisexual but very protogynous. The crimson-flecked corolla lobes of the flower bud open apically and the two pale green style branches emerge erect. The corolla lobes enlarge and gradually recurve, as do the style branches, and after several days these lie across the corolla mouth. During the latter part of this time the tube and stamens have elongated and eventually the anthers stand about half a millimetre above the corolla mouth, when they dehisce introrsely. The pollen tends to be retained in the opened anther locules. The character of the pollen is described by Moar (1993).

Thompson (1881) speculated that *Nertera* flowers are wind-pollinated. However, the corolla's 'frosted' texture and crimson mottling invite comparison with flowers of *Corybas* species (Orchidaceae), at least some of which are known (Fuller 1994, J.B. Irwin pers. comm.) to have fungus gnats (*Mycetophila* spp.) as pollinators. *Nertera dichondrifolia* has flowers much like those of *N. scapanioides*, and in the former species small flies have been seen feeding on exudate or pollen of the stigmas (R.O. Gardner pers. obs.). In addition, the suggestion has been made (E.K. Cameron pers. comm.) that these flowers might also be "splash-pollinated".

Fruit set in natural populations of *N. scapanioides* is usually ample. The fruit becomes coloured and fleshy after about seven weeks growth, and when fully ripe can be detached by the merest touch. They can float, but the pyrenes sink. Presumably the fruit can also

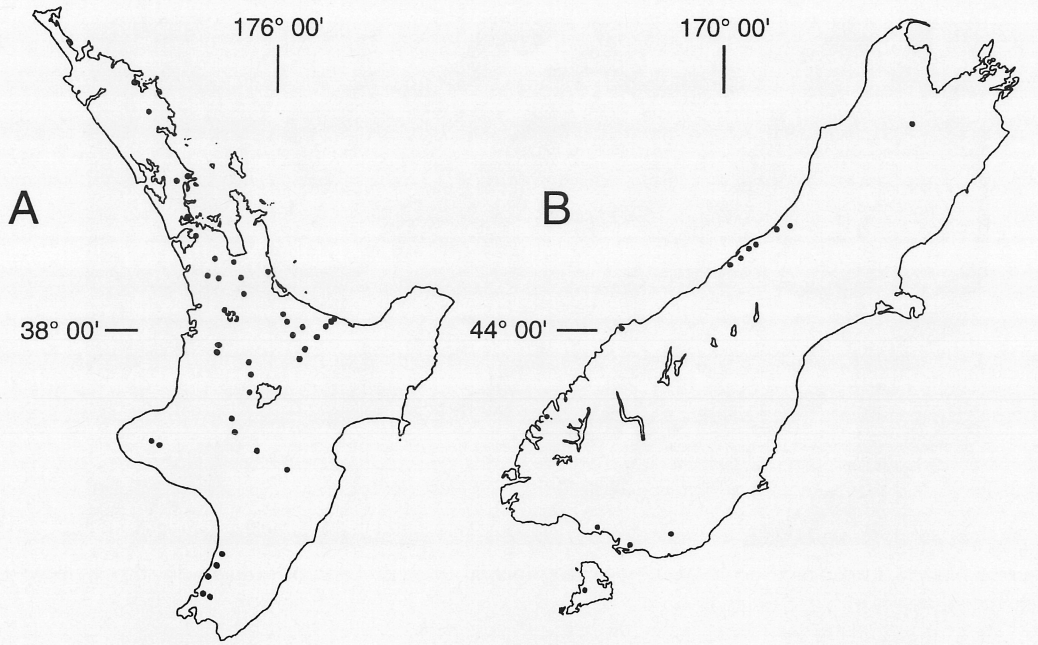

Figure 2 Distribution of *Nertera scapanioides*. A, North Island; B, South Island.

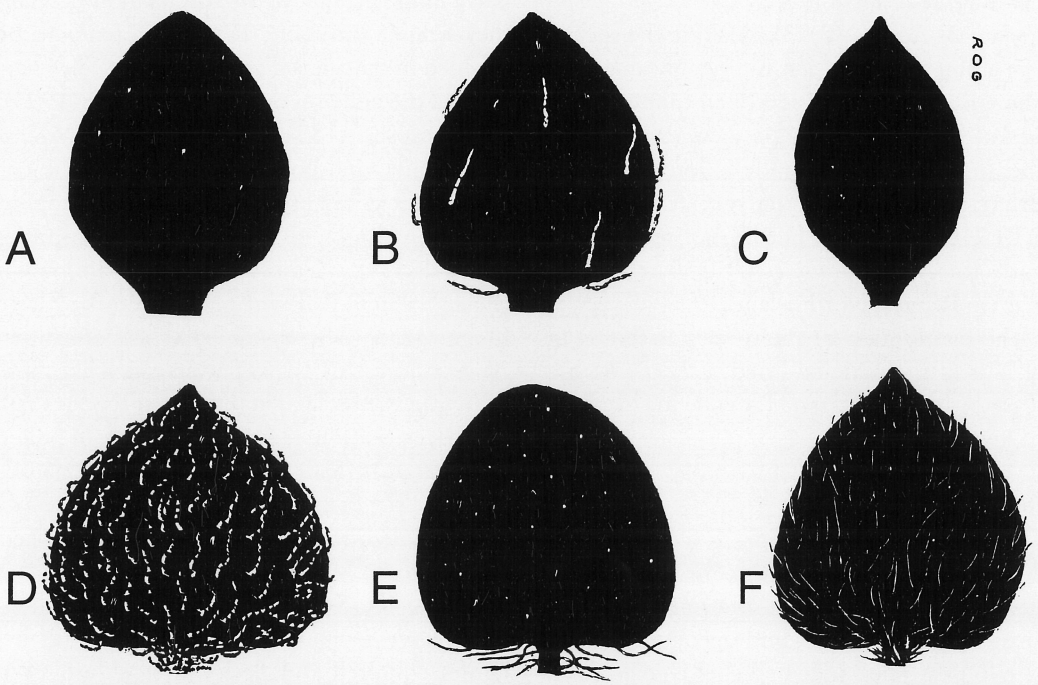

Figure 3 Leaves of New Zealand *Nertera* species. A, *N. balfouriana*; B, *N. ciliata* C, *N. depressa*; D, *N. dichondrifolia*; E, *N. scapanioides*; F, *N. villosa*. Sizes standardized.

be dispersed by birds and lizards.

Historical Notes

The holotype, on a single sheet (and there are no other sheets of *N. scapanioides* at the Botanical Museum, University of Copenhagen - B. Hansen pers. comm.) bears no collector's name, and concerning locality the protologue only states "*Plantulam ex horto bot. Hullensi, in schedula 'ignota e Nova Zealandia' designatum accepimus*", that is, it came into Lange's hands as a young plant sent from the Botanic Garden at Hull, without any collection details save the indication of a New Zealand origin.

However, in a work on alpine garden plants by Wooster (1874) there is a coloured plate of the species and a few lines of discussion, in which it is stated that the "opportunity of figuring this plant" is due to a "Mr Niven". Almost certainly this would be J.C. Niven (1828-1881), gardener at Kew from 1846 and then from 1853 the energetic Curator of the Botanic Garden at Hull (Desmond 1977). Here the trail stops: there is no mention of *N. scapanioides* in Niven's catalogue of herbs grown at Kew (1853), nor is there any relevant specimen at Kew (D. Bridson pers. comm.) or in the University of Hull herbarium (V. Swetez pers. comm.). It seems reasonable then to suppose that some collector, perhaps an amateur, gave material of the species to Niven during the latter's time at Hull.

Representative Specimens

Northland

Kerikeri Inlet Road, *R. Mason* & *N.T. Moar*, 3 Dec 1949, CHR 69668

Otakaiangi Swamp, *M. Heads*, 13 Nov 1996, herb. Heads "peat swamp with *Coprosma tenuicaulis* dominant"

Auckland

Omaha sandspit, *P.J. de Lange*, 20 Nov 1986, WAIK 6917 "common amongst kahikatea roots"

near Warkworth, *M.E. Young*, 22 Mar 1995, AK 222529 "in sphagnum bog with manuka"

Lake Takapuna [Pupuke], *T.F. Cheeseman*, Sept 1881, AK 9147

Papatoitoi [Papatoetoe], *T. Kirk*, Oct 1865, WELT 17619 "*N. gracilis* Raoul; *N. dichondraefolia* Hook. f."

Thurlow's Farm, Papatoetoe, *E.K. Cameron* & *M. Smale*, 1 Jul 1994, AK 220751 "under 4-6 m tall manuka, associated with *Sphagnum* [*novo-zelandicum*] and *Coprosma tenuicaulis*"

South Auckland

Whangamarino Swamp, *C.C. Ogle*, 12 Apr 1983, CHR 404682

Ngatea, *J. Dingley*, Oct 1969, CHR 167454

Ohinemuri River tributary, *R.O. Gardner*, 11 Dec 1984, AK 171980

Kopuatai Peat Dome, *R. Irving*, 14 Oct 1983, WAIK 4308

Opuatia wetlands nr Lake Whangape, *P.J. de Lange*, 15 Nov 1986, WAIK 6585

Lake Rotokawau, *P.D. Champion*, 25 Jan 1983, WAIK 3174

Morrinsville, *D. Petrie*, Dec. 1905, WELT 17648-52 [labelled only "*Nertera* "]

Tuatuamoana Bog [Moanatuatua Swamp], *L.M. Cranwell*, Jan 1935, AK 36926

Moanatuatua Swamp, *R.O. Gardner*, 30 Dec 1978, AK 148979 "common on wet peat, especially on inside of drainage ditches"

Lake Maratoto, *M.A. Chapman*, Jan 1977, WAIK 2077

Lake Rotopataka, *P.J. Champion*, 11 Oct 1989, WAIK 10758 "amongst *Centella uniflora* under tall willow and manuka on margin of lake"

Bay of Plenty - Rotorua

Matata, *R. Mason*, 18 Feb 1963, CHR 126946

Mamaku Plateau, Mangapapa Ecological Area, *M.C. Smale*, 2 Jul 1983, NZFRI 13311 "on rotten log in beech-podocarp forest; only one plant seen"

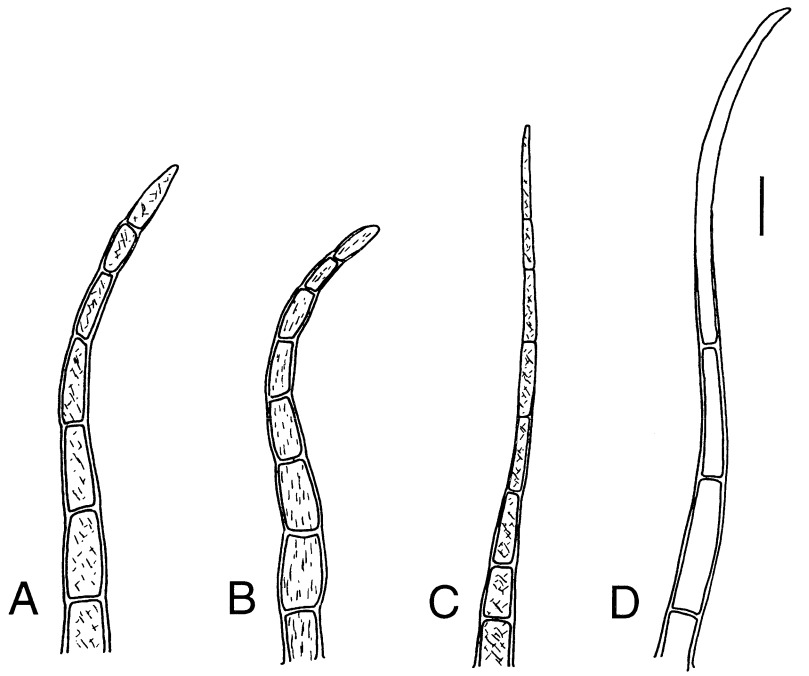

Figure 4 Hairs of New Zealand *Nertera* species. A, *N. ciliata*; B, *N. dichondrifolia*; C, *N. scapanioides*; D, *N. villosa*. Scale bar equals 0.1 mm.

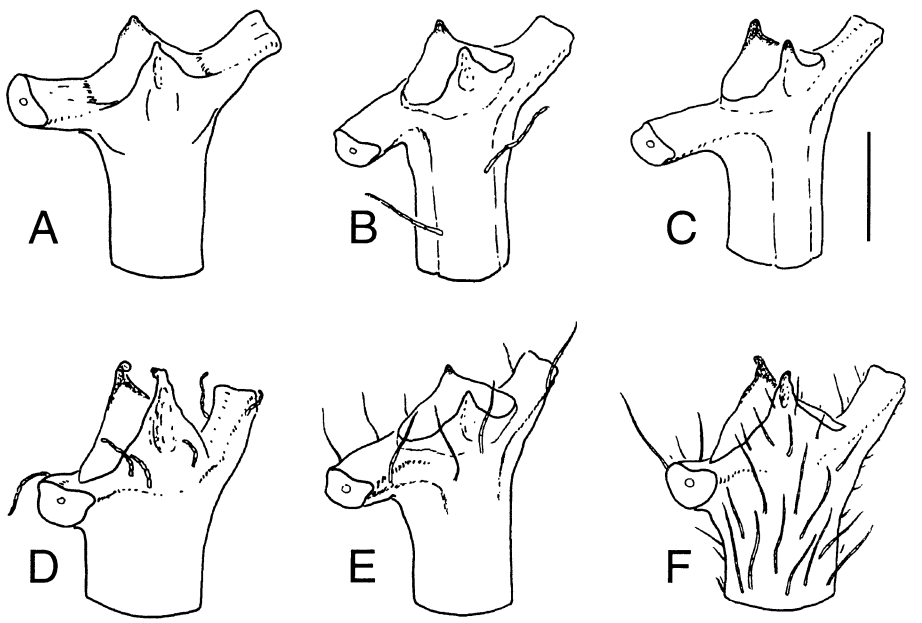

Figure 5 Stipules of New Zealand *Nertera* species. A, *N. balfouriana*; B, *N. ciliata*; C, *N. depressa*; D, *N. dichondrifolia*; E, *N. scapanioides*; F, *N. villosa*. Scale bar equals 1 mm.

Tumarau Lagoon, *S.M. Beadel*, Jul 1992, NZFRI 19956 "manuka shrubland"

Mamaku Plateau, south of Lagoon Rd, 500 m, *E.K. Cameron*, 10 Apr 1993, AK 218757 "common through *Sphagnum cristatum* in undisturbed *Baumea* swamp"

Hinehopu Swamp, *B.D. Clarkson*, 12 Oct 1982, NZFRI 12546

Waiotapu, S of Lake Ngakaro, *C.E. Ecroyd*, 13 Mar 1985, NZFRI 15081 "in flax swamp, some nearby under *Pinus pinaster*"

Rotorua, *D. Petrie*, Nov. 1897, WELT 17647A, -B

Reporoa, *D.R. Given*, 29 Nov 1979, CHR 506086

King Country

Mangapu Stream, *R.O. Gardner*, 21 Jan 1982, AK 158687 "on peaty mud at upper margin of pole *Dacrycarpus dacrydioides* swamp forest"

South of Rangitoto Ra., Waipapa Ecological Area, *R.O. Gardner*, 8 Jan 1982, AK 158586 "common on peaty mounds in open wet *Astelia grandis* - manuka-*Baumea* spp. swamp"

Mt Pureora, 1165 m, *B.D. Clarkson*, 14 Jul 1982, WAIK 15019

Hauhangaroa Ra., Whenuakura clearing, *C.E. Ecroyd*, 18 Sept 1984, NZFRI 14881

Urewera

Puna Hokoi clearing, W. of L. Waikareiti, *A.P. Druce*, Feb 1968, CHR 180665

Aniwaniwa Valley, *A.P. Druce*, 12 Jan 1953, CHR 82421

Urewera National Park, Oranga Kohau, *W.B. Shaw* & *S.M. Beadel*, 18 Nov 1984, NZFRI 16228, "in montane mire; growing amongst hummocks of *Gleichenia dicarpa* and *Empodisma minus*"

Volcanic Plateau

NW of National Park, *R.O. Gardner*, 28 Jan 1984, AK 166369 "margin of *Carpha-Empodisma* bog"

Erua Railway Station, *I.A.E. Atkinson*, Mar 1964, CHR 151124

Waiouru, *C.C. Ogle*, 22 May 1985, CHR 464195

Taranaki

Stratford Bog, 600 m, *A.P. Druce*, Nov 1961, CHR 159666

E side of Mt Egmont, Ngaere Swamp, 230 m, *A.P. Druce*, Mar 1973, CHR 245691

Lower North Island

N. Ruahine Ra., Reporoa Bog, 1150 m, *A.P. Druce*, 8 Jan 1948, CHR 310216

Paraparaumu, *A.P. Druce*, Oct 1967, CHR 179534 "manuka scrub on peat"

Plimmerton, *N.T. Moar*, 22 Jan 1949, CHR 64959 "*Leptocarpus* community, *Phormium* swamp"

Mangaroa Swamp, *A.P. Druce*, Oct 1959, CHR 140325, -6

Nelson

Hope Valley, 450 m, *A.P. Druce*, Jan 1988, CHR 395713

Buller - Westland

Break Creek, Karamea, *P. Wardle*, 30 Nov 1984, CHR 419014

S of Tauranga Bay, *R. Mason* & *N.T. Moar*, 5 Feb 1953, CHR 81182, 81354 "swamp behind sand dunes ... growing in *Sphagnum*"

Charleston, *L.B. Moore*, 15 Jan 1967, CHR 174582 "with *Bulbinella modesta* in pakihi"

Lower Kokotahi Valley, *R. Mason* & *N.T. Moar*, 13 Feb 1958, CHR 97639

S of Mikonui, *R. Mason* & *N.T. Moar*, 1 Mar 1958, CHR 107350

Wanganui River, *D.A. Norton*, 15 Jan 1987, CANU 35715

Okarito, *P. Wardle*, 15 May 1967, CHR 166959

Omoeroa Saddle, 300 m, *P. Wardle*, 2 Dec 1970, CHR 214803, "on *Sphagnum* cushions in swamp"

Fiordland

Expectation Stream, Caswell Sound, *V.D. Zotov*, 28 Mar 1949, CHR 78270
Cascade River mouth, *P.N. Johnson*, 1 Apr 1977, CHR 310962

Southland

Otautau, *N.T. Moar*, 20 Feb 1953, CHR 70844, -5 "rand of bog"
Clinton-Mataura, *R. Mason* & *N.T. Moar*, 18 Feb 1952, CHR 75941
Awarua, *P.N. Johnson*, 20 Apr 1968, CHR 455250

Stewart Island

Rakeahua Valley, *H.D. Wilson*, 18 Apr 1978, CHR 324038, "under red tussock & manuka"
Big South Cape I., *B.A. Fineran*, 28 Feb 1965, CANU 8456.

Comparisons with other New Zealand species

The following short descriptions, and Figures 3, 4, 5 and 6, emphasize the vegetative differences among the six N.Z. *Nertera* species. The chromosome number for all these species is n=22 (Hair 1963).

Nertera balfouriana Cockayne

Hairs usually lacking from all parts; stipules running into petiole margins, sheath (always?) lacking; leaf blade to c. 4(-6) mm long, ± oblong to suborbicular, us. rounded at apex, tapered to rounded at base; stomata present on both surfaces, obscure in dried specimens; fruit yellow to reddish, pear-shaped, c. 6.5-9 mm long.

North Island: southwards from Mt Egmont and Volcanic Plateau but absent from East Cape region. South Island: Almost throughout South I. but apparently absent from Fiordland. Stewart I. Absent from Chatham Is.

A cold-climate species of bogs and damp open grassland. Robust material might be mistaken for *N. depressa* but that species has acute leaves, sheathing stipules and foetid tissues.

Nertera ciliata Kirk

Hairs septate, c. 5-7-cellular, to c. 0.6 mm long, fairly straight in life, somewhat collapsed and contorted when dry (plant sometimes almost glabrous); stipules joining in U-shape above petiole bases to form a very low sheath, or sheath lacking; leaf blade to c. 7 mm long, ± broad-ovate, acute (-rounded) at apex, rounded to truncate at base, with widely- spreading hairs usually present around margins, hairs sometimes also on upper surface and on midrib below; stomata present on both surfaces, sometimes raised above when dry; fruit reddish, ± globose, c. 4 mm diam., sparsely hairy.

North Is.: southwards from Te Awamutu (P.J. de Lange pers. comm.) and Mt Tarawera, present on Mt Egmont and Hikurangi. South I.: throughout, to at least 1140 m. Stewart I. Absent from Chatham Is.

Grows in a variety of damp open sites (mostly at high altitude in the North I.), often on gravels.

Nertera ciliata can be difficult to tell from *N. depressa* if it is only sparsely hairy (e.g. Mt Sebastopol: AK; CHR 108240) or apparently quite glabrous (Stewart I., WELT 43644). It is, though, a more robust and non-foetid plant, and its leaves are firmer in texture, with a broader petiole and a less acute apex to the blade. Material has also been seen misidentified as *N. scapanioides*, but under the microscope the thick- walled and strongly striated hairs of *N. ciliata* are quite different (Fig. 4). Confusion with *N. dichondrifolia* is also possible (though the ranges of these species are almost entirely disjunct); however, the hairs of that species tend to be more strongly curved even when dry, and they are striated differently.

Nertera depressa Banks & Sol. ex Gaertn.

Tissues foetid; hairs lacking from all parts; stipules joined in U-shape above petiole bases to form a low sheath; leaf blade to c. 5 mm long (but to

c. 10 mm in some Fiordland and Auckland Is. plants), ± ovate, acute (rarely obtuse) at apex and usually minutely apiculate, cuneate to rounded or truncate at base, with stomata on both surfaces, these sometimes slightly raised above when dry; fruit reddish, ± globose, c. 4 mm diam.

Three Kings Is. North I.: throughout South I.: throughout. Stewart I. Chatham Is. Subantarctic Islands.

Grows in damp open or lightly shaded places such as rocky stream edges, rotting logs, clay banks. It is the most common and variable of the New Zealand *Nertera* species (and is taken here to include *N. cunninghamii* Hook. f.). It is stated by Allan (1961) that this plant may have a few hairs on rare occasions, but I have not seen any specimens to support this.

The question is not answered here of whether or not the New Zealand taxon is conspecific with *Nertera granadensis* of Central America, and with the plants of this affinity distributed widely around the Pacific Ocean.

Nertera dichondrifolia (A. Cunn.) Hook. f.

Hairs septate, c. 5-7-celled, to 0.5 mm long, usually antrorsely curved when fresh, contorted and partly collapsed when dry; stipules meeting in a V immediately above petiole bases, not forming a sheath; leaf blade to c. 12 mm long, ± broad-ovate (seldom longer than wide), subacute to slightly apiculate at apex, ± truncate at base, hairs present on upper and lower surfaces and margins, stomata only on lower surface, these rather crowded and hence the lamina pale below especially in live material, especially the upper surface with a rather regular patterning made by the ± hexagonal epidermal cells (surface colliculate in live material, alveolate when dry); fruit reddish, ± globose, c. 5 mm diam., sparsely hairy.

Three Kings Is. (AK 231836). North I.: southwards to Rakaunui (Kawhia Harbour, 38° 08' S) and Otara Valley (near Opotiki, 38° 03' S).

Grows in mesic to damp sites in scrub and forest, on litter or rotting logs, etc.

Nertera scapanioides Lange

Hairs septate, 5-13-celled, to 0.8 mm long; stipules joining in U-shape above petiole bases to form a low sheath; leaf blade to c. 6.5 mm long, broad-ovate to almost suborbicular, rounded at apex, cordate at base, glabrous or sometimes with hairs on proximal margins (rarely on surfaces), with stomata on both surfaces, these usually conspicuous above as pale tubercules when dry; fruit reddish, ± globose, c. 4 mm diam., glabrous.

North I.; almost throughout (not known from East Cape and Hawkes Bay-Wairarapa.) South I.; almost throughout (not known from Marlborough, Canterbury and Otago). Stewart I. Absent from Chatham I.

Grows in low- to mid-altitude oligotrophic to somewhat mesotrophic bogs.

Nertera villosa B.H. Macmill. & R. Mason

Hairs c. 3-5-celled, to 1.25 mm long, not collapsing or contorting when dry; stipules meeting in a V above petiole bases, not forming a sheath; leaf blade to c. 16 mm long, broad-ovate (seldom wider than long), rounded to subacute at apex, truncate to slightly cordate at base, hairs present on both surfaces but lacking from margins; stomata lacking from upper surface, rather crowded below and hence the lamina somewhat pale there, upper surface hardly alveolate when dry; fruit reddish, ± globose, c. 6 mm diam., hairy.

North I.: Waipoua Forest (AK 228427), then apparently absent until the Hunua Range at c. lat. 37° 05' S. South I.: almost throughout, absent from Fiordland. Stewart I. Chatham Is. (AK 228197).

Grows in forest, on litter, rotting logs, streamside rocks, etc.

The possibility that this species might be the same as the plant obtained by Raoul in 1843 at "Akaroa" and subsequently named by him *Nertera gracilis* was dispelled by B.H. Macmillan (pers. comm.), who examined the two type sheets at Paris (P) and found that they represent not

N. villosa but *N. dichondrifolia*. Presumably these collections were actually made in the Bay of Islands, the only other place in New Zealand Raoul collected from.

Representative Specimens (*Nertera* spp. other than *N. scapanioides*)

N. balfouriana

Lake Ida, *R.O. Gardner*, 9 Dec 1994, AK 224238
Mt Cook, *J. Adams*, Jan 1898, AK 15529
Tasman Valley, *T.F. Cheeseman*, Jan 1898, AK 9139
Mason's Bay, *J.E. Attwood*, 15 Jan 1940, AK 36912

N. ciliata

Ranginui, inland from Otorohanga *R.O. Gardner*, 16 Dec 1981, AK 158710
NW of National Park, *R.O. Gardner*, 28 Jan 1984, AK 166370
Perry Saddle, *M.J.A. Simpson*, 21 Jan 1973, CHR 278250
Franz Josef, *R. & E.F. Melville*, 8 Apr 1962, AK 155503
Mt Sebastopol, *T.F. Cheeseman*, Jan 1898, AK 9138

N. depressa

Herekino, *H. Carse*, Jan 1898, AK 36927
Clevedon, *A.E. Orchard*, 25 Apr 1972, AK 129666
Kaitieke, *R.O. Gardner*, 23 Feb 1984, AK 165993
Westport, *W. Townson*, no date, AK 9136
Chatham I., *K. Olsen*, 9 Jan 1978, AK 150016

N. dichondrifolia

Taipa, *H.E. Powell*, 22 Jan 1950, AK 26438
Puketi Forest, *P.J. Bellingham*, 6 Jul 1984, AK 167652
Waitakere, *T.F. Cheeseman*, Dec 1884, AK 9146
Komata Valley, *A.E. Wright*, 20 Mar 1982, AK 159145
Rakaunui Valley, *P.J. de Lange*, 20 Aug 1984, AK 170526

N. villosa

Waipoua Forest, *P.J. de Lange & G.M. Crowcroft*, 25 Apr 1996, AK 228427
Kohukohunui, *R.O. Gardner*, 27 Aug 1981, AK 155445
Bealey, *T.F. Cheeseman*, Jan 1881, AK 9152
Stewart I., Ulva I., *P. Hynes*, 5 Feb 1963, AK 92008
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